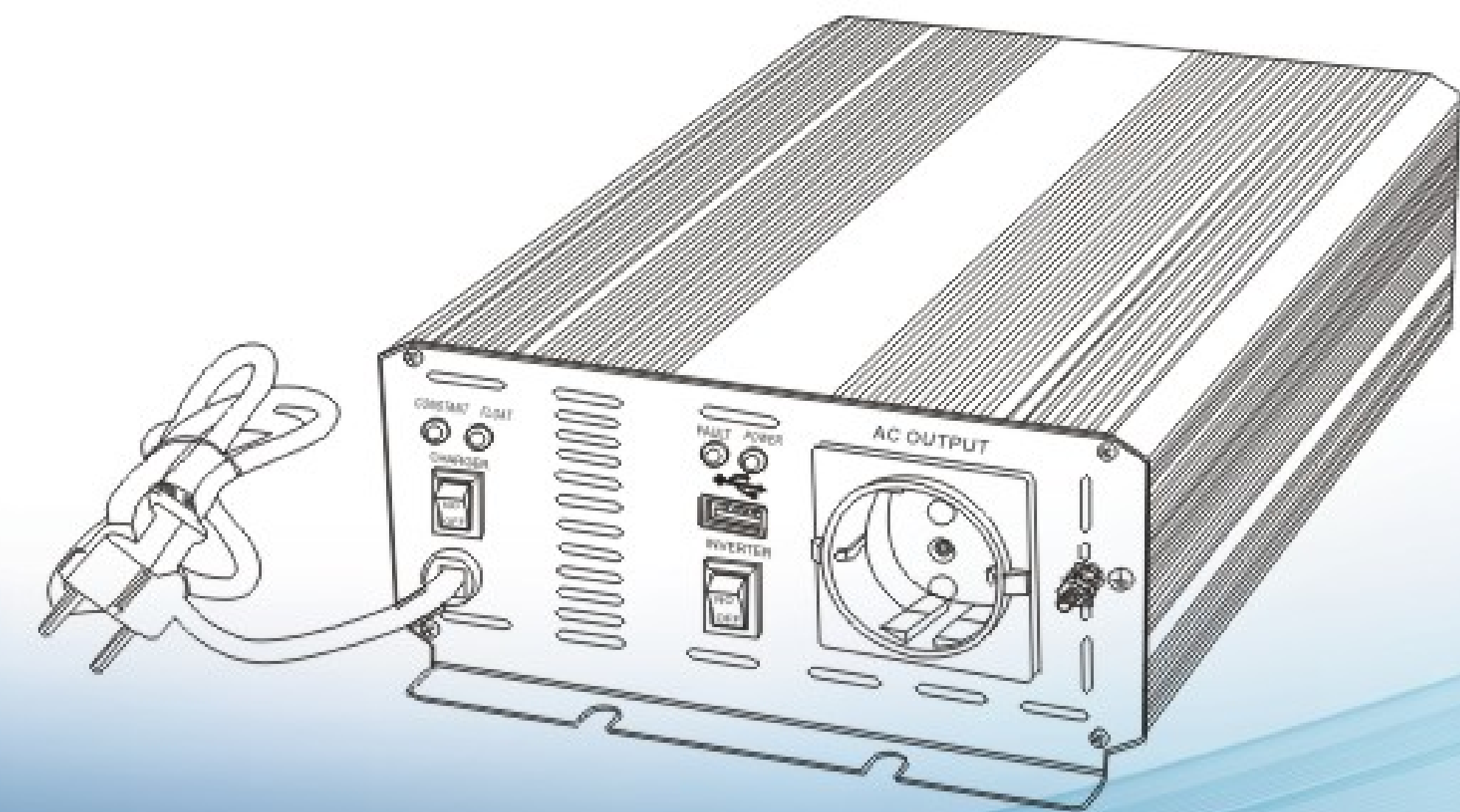


# POWER INVERTER WITH CHARGER

*SOU series*

## User Manual



- Before using this product, please read the instruction manual carefully.
- Please keep this book, so that the future query can be consulted at any time.
- Please use the product based on fully understanding the manual



## 1. INTRODUCTION

Thanks for choosing our fully auto. backup domestic SOUseries Inverter with Charger (hereinafter called the UPS). It's a heavy duty Uninterruptible Power Source (U.P.S.) which is a perfect combination with a high efficiency inverter, a bypass public power auto. switch system and a fully auto. battery charger. When the public power is off, it converts the battery's DC to AC to support the electrical appliance's work. When the public power is on, it auto. switches to use main AC power and then auto 3 stage charge (constant current, constant voltage, floating charge) for your battery, the transfer time is less than 8 ms without any influence to your AC appliances.

## 2. FEATURES

- With auto. protection functions: Earth Leakage Protection, Reverse Polarity, Overload, Over Voltage, Over Temperature, Low Voltage, Short Circuit.
- With isolation low interference technology, soft-start.
- Transfer time between bypass and inverter mode is less than 8ms, without any influence to your appliance's working when public power is off.
- Two ON/OFF switch (inverter switch, charger switch), it supports battery deep discharge.
- Four LED indicators with color red, green, green and red(Fully Charged, Constant charge, Inverter, Fault).
- PWM high-frequency technology, small in size, big power.
- Input AVR function: automatically voltage regulation to ensure the input AC voltage stable and best performance in the charger part.

## 3. SAFETY FIRST

To ensure reliable service, it must be installed and used properly. Please read the installation and operating instructions thoroughly prior to installation and use. Pay special attention to the WARNINGS and CAUTIONS statements in this manual. The CAUTION statements advise against certain conditions and practices that may result in damage in your UPS. The WARNINGS statements identify conditions or practices that may result in personal injury.

**Read all instructions before using this UPS!**



**WARNING!**  
To reduce the risk of fire, electric shock, explosion or injury.

- Sparking may occur when connecting the unit to the battery, make sure no flammable fumes present before making any connections.
- Remove appliance plug from outlet strip or turn off UPS before working on the appliance. And do not expose UPS to the water, rain, snow or spray environment.
- This is not a toy please keep away from children.
- Do not install any other object into the air vents.
- No user-serviceable components inside. Do not attempt to open the UPS by yourself.



**WARNING!**  
To reduce the risk of fire, electric shock, explosion or injury.

- Do not operate this UPS if it is wet , and do not install it in engine compartment- please install it in a well ventilated area, to avoid too high temperature.
- Do not connect live AC main power to the UPS's AC outlets, it may cause the UPS's permanent damage.
- Please pay special attention to the connection method part in this manual, avoid the polarity reverse connection.

## 4. OPERATION ENVIRONMENT

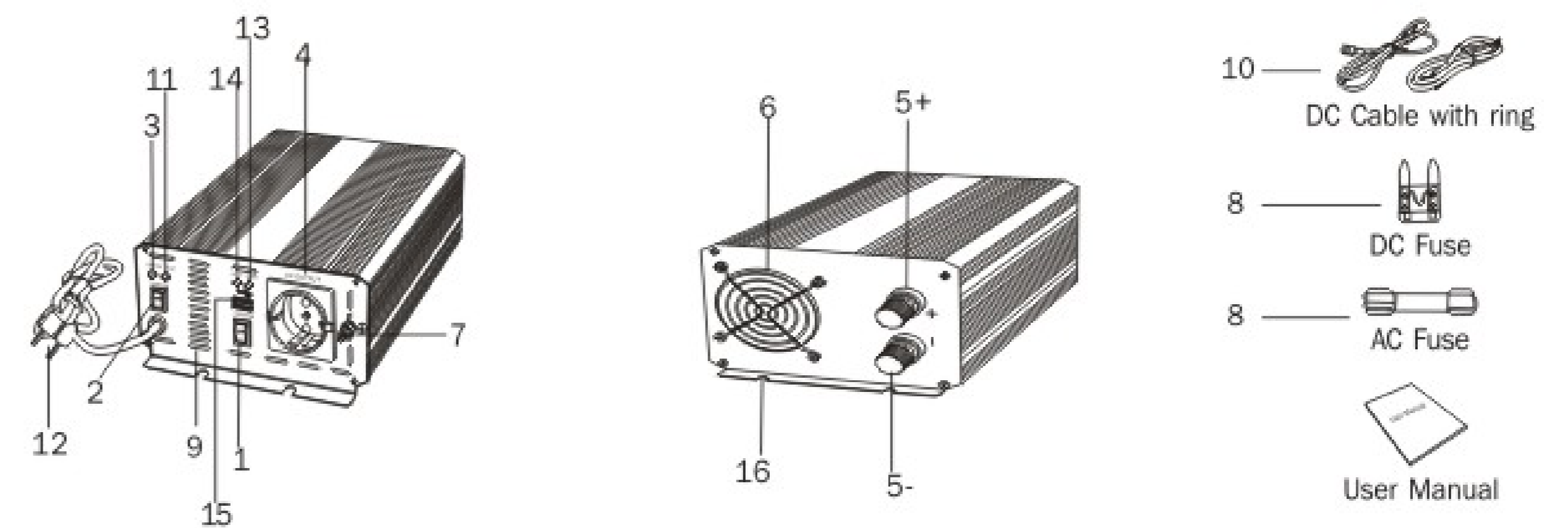
For best operating performance, the UPS should be placed on flat surface, such as ground or other solid surface, install

the UPS in a location that is:

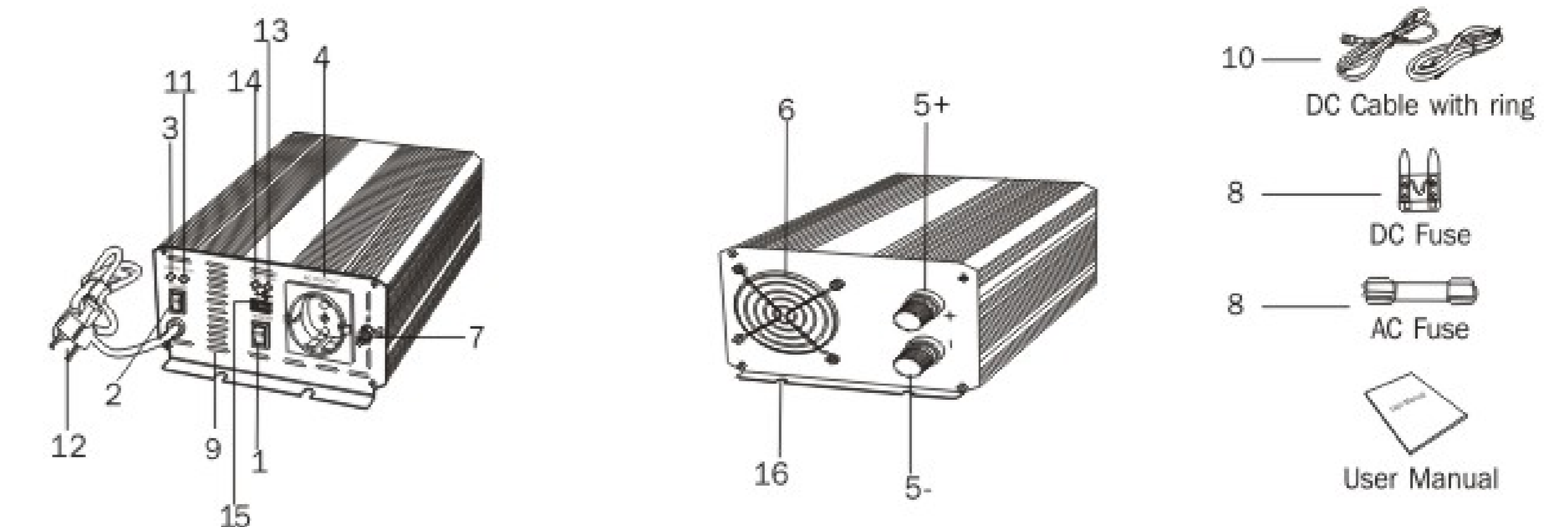
- DRY.** Do not allow water and/ or other liquids to come into contact with the UPS. In all marine applications, do not install the UPS below or near the waterline and keep the UPS away from moisture or water.
- COOL.** Ambient air temperature should be between 30° F (-1° C ) non-condensing, and 105° F (40° C) . Do not place the UPS on or near a heating vent or any pieces of equipment which is generating heat above room temperature. Keep the UPS away from direct sunlight, if at all possible.
- VENTILATED.** Keep the area surrounding the UPS clear to ensure free air circulation around the unit, do not place items on or over the UPS during operation. A fan is helpful if the UPS is operating at maximum power outputs for extended periods of time. The units will shut down if the internal temperature exceeds operating temperature and restart after it cooling.
- SAFE.** Do not use the UPS near flammable materials or in any locations that may accumulate flammable fumes of gasses.

## 5. PRODUCT MATERIALS LIST AND INDICATION

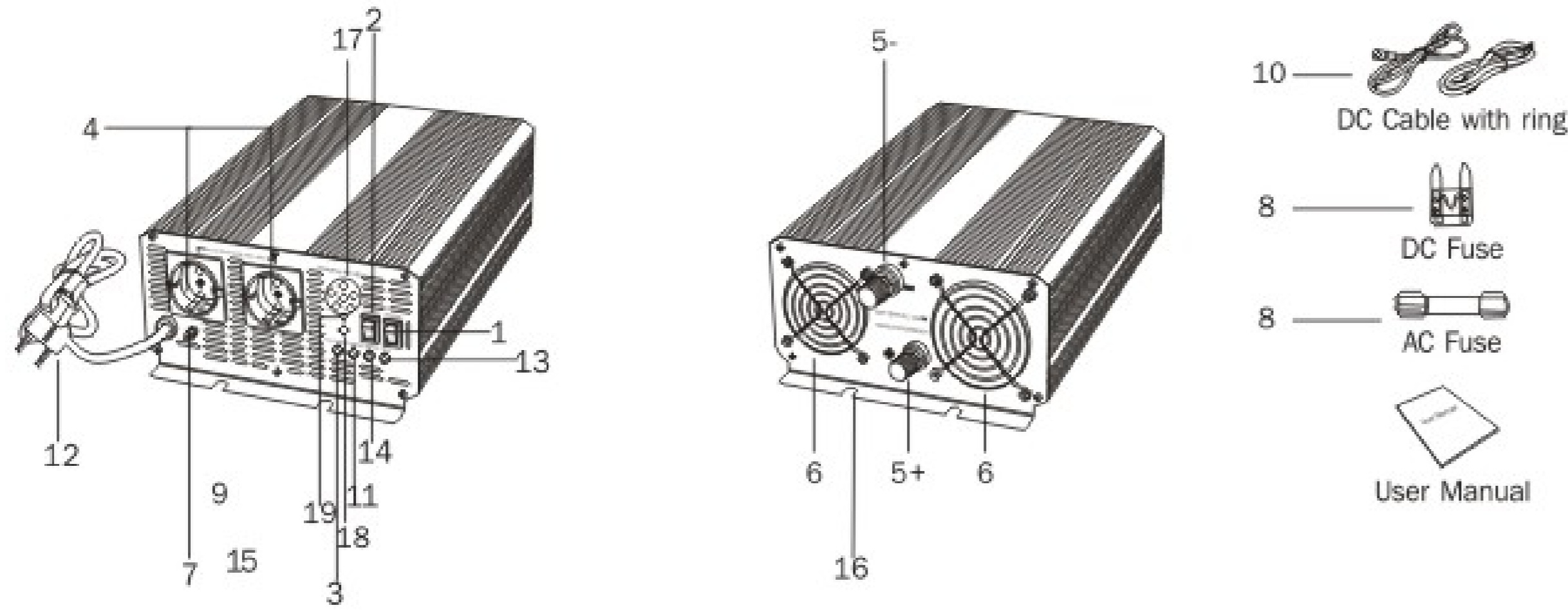
### 5.1. SOU-600~SOU-800



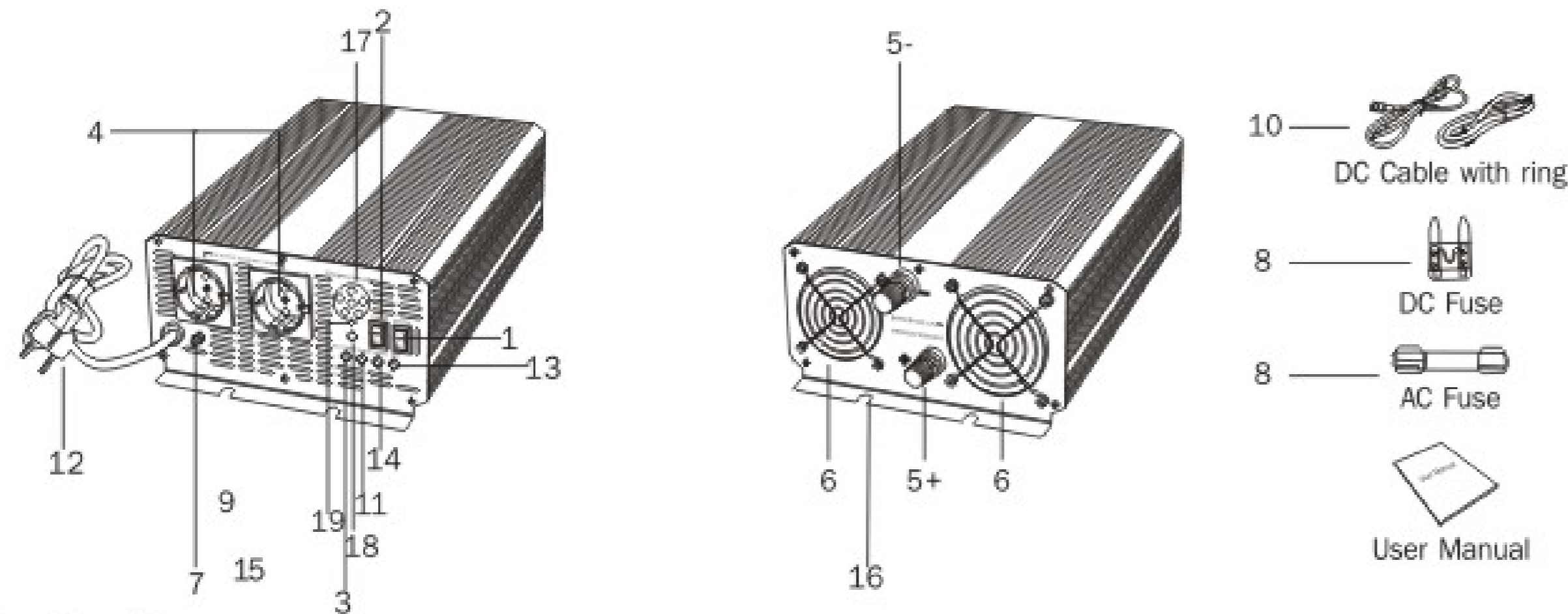
### 5.2. SOU-1000~SOU-1500



### 5.3. SOU-2000(with emergency light)



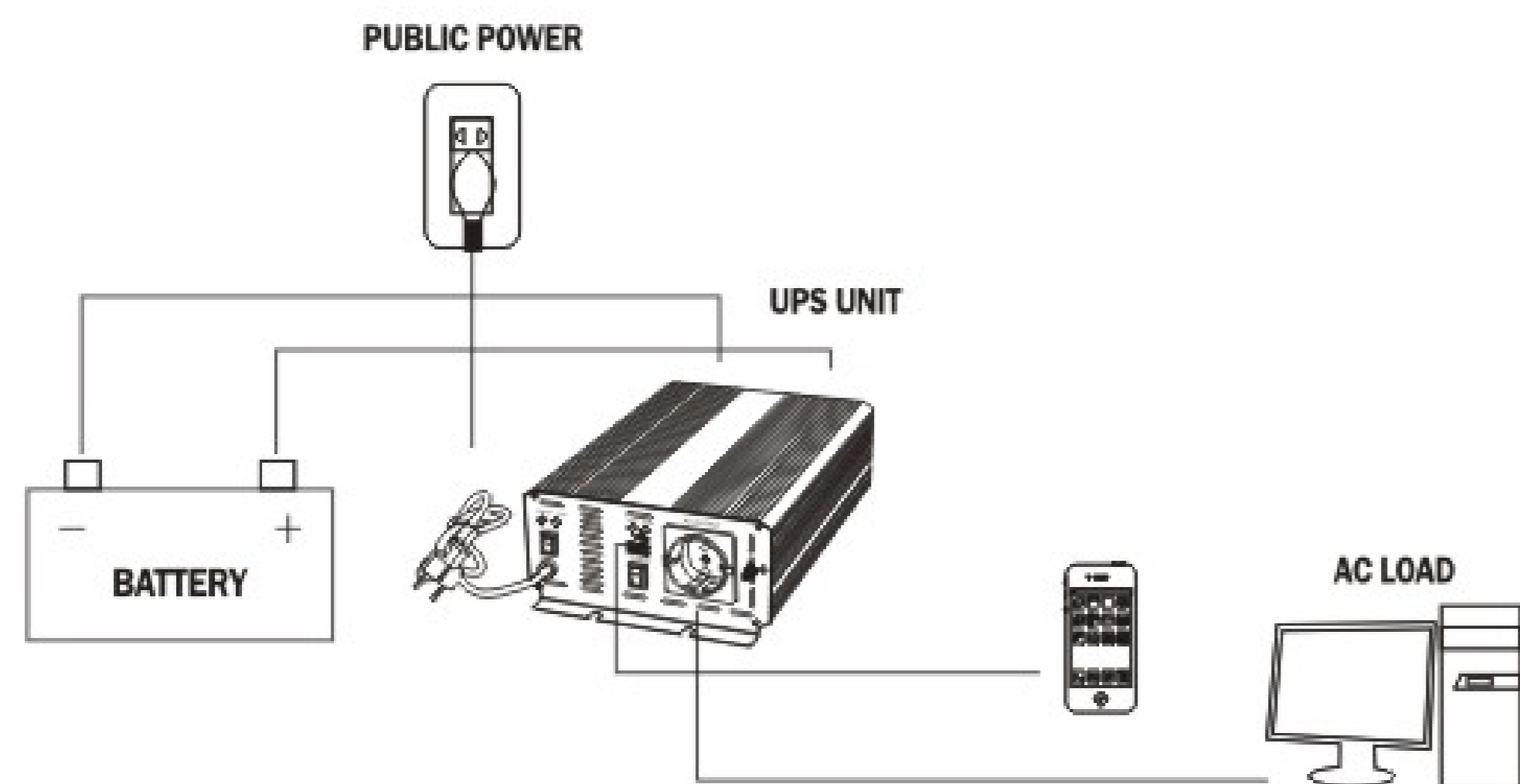
### 5.4. SOU-2500~SOU-3500(with emergency light)



#### Indication:

- |   |                         |  |
|---|-------------------------|--|
| 1 . Inverter ON/OFF switch              | 7 . Grounding terminal  | 14 . Fault LED                                 |
| 2 . Charger ON/OFF switch               | 8 . Fuse                | 15 . USB output                                |
| 3 . Constant LED                        | 9 . Ventilation hole    | 16 . Slots for installation                    |
| 4 . AC outlet                           | 10 . DC cable           | 17 . LED emergency light (optional)            |
| 5- . DC input terminal (black-negative) | 11 . Float LED          | 18 . Switch for LED emergency light (optional) |
| 5+ . DC input terminal (red-positive)   | 12 . AC power cord      | 19 . Light-sensitive sensor(optional)          |
| 6 . Cooling fan                         | 13 . Inverter power LED |  |

## 6. INSTALLATION



#### NOTE:

- You can use one or more batteries. It is best to use 100 Ah or larger battery for long back-up time.
- If grid power available, AC bypass the inverter & power-for the electrical appliances ("charger" mode ON by switch ON the (1)). Also charge the battery / batteries. ( Both "Inverter" & "Charger" mode on by switch on the (1) and (2) ).
- If AC failure, UPS converts the battery DC power to AC then power-up the electrical appliances. (Must switch on the "Inverter" mode (1) ).

6.1. There is cable with clip inside of packaging, use the cable connect the unit directly to the battery. The input terminals on the rear side of the unit are Red-positive (5+) and Black-Negative (5-). Connect the red cable to the red terminal and battery clip to the positive pole of the battery. Connect the black cable to the battery clip to the negative pole of the battery. Make sure all connections are solid and secured. Poor connections may cause overheat the cable, terminals or clips and also shorten the battery backup time. ( Ensure that the inverter and charger mode all OFF before connect to battery).

**⚠ WARNING!**  
To reduce the risk of fire, electric shock, explosion or injury.

- The reverse polarity will burn the fuse or may cause the damage of the UPS. So please pay more attention to it. The damage caused by wrong connection is not cover by our warranty.
- The UPS must be connected only to batteries with a normal output voltage of 12 volts. The power source can be a 12V battery or several 12V batteries connected in parallel / in series to increase the backup time. The unit will not operate from a 6 volt battery, and will sustain permanent damage if connected to a 24 volt battery.
- Keep ventilation when using batteries. Batteries may generate flammable gas during charging and discharging.
- Sparking may occur when connect the unit to the battery, make sure no flammable fumes present before making any connections.
- Please use the DC cables (10) inside which the packing to ensure best performance.

6.2. Connect the grounding terminal (7) to earth. If you can, please do it to ensure safety.

**Note: Before use the UPS, please provide a grounding cable . There is a terminal fitted with a nut at the UPS's output panel. Please choose heavy duty, green insulated cable and driven into the ground at a depth of 1-2m or more.**

6.3. Connect UPS's AC power cord(12) to public power. Your appliances are now power-up by the public power.

**Note: Do not operate it by wet hand!**

6.4. After proper connection inverter and charger switch (1) and (2) and the LED display state belows:

SWITCH	STATE	LED INDICATION	EXPLANATION
Inverter OFF/ON Switch(1)	ON	Inverter green LED(13) lit	Battery in good condition, inverter is ready for use
		Fault red LED(14) lit	Battery over discharge, low voltage or short circuit, overload, short circuit protection function (Refer to part 10)
Charger OFF/ON Switch(2)	ON	Constant red LED (3) lit	Battery has been constant charging
		Float green LED (11) lit	Public power on, charger mode is working
		Fault red LED (14) lit	Public power AC input is not in good condition

**WARNING!**  
When the public power on, although (1)(2) both are off and LED is not lit, there is still live power existed in UPS output socket , please pay attention to avoid any injury.

We advise that you can switch off the charger ON/OFF switch (2) after using UPS one month, for supporting battery deeply discharge.

6.5. Plug your AC appliance into the UPS's outlet.

Make sure your appliance is turned off before connecting to the unit. Please turn on your appliances one by one. Now your appliance are functioning. If rated power is overload, the red LED (14) will light and the inverter will shut down. To reset, reduce the load and if your appliance required power within UPS's rated power inverter shall restart automatically.

**WARNING!**  
We advise that do not use the appliance which power more than 90% of the UPS's rated power. Although there is a overload protection in UPS, it also may damage the unit.

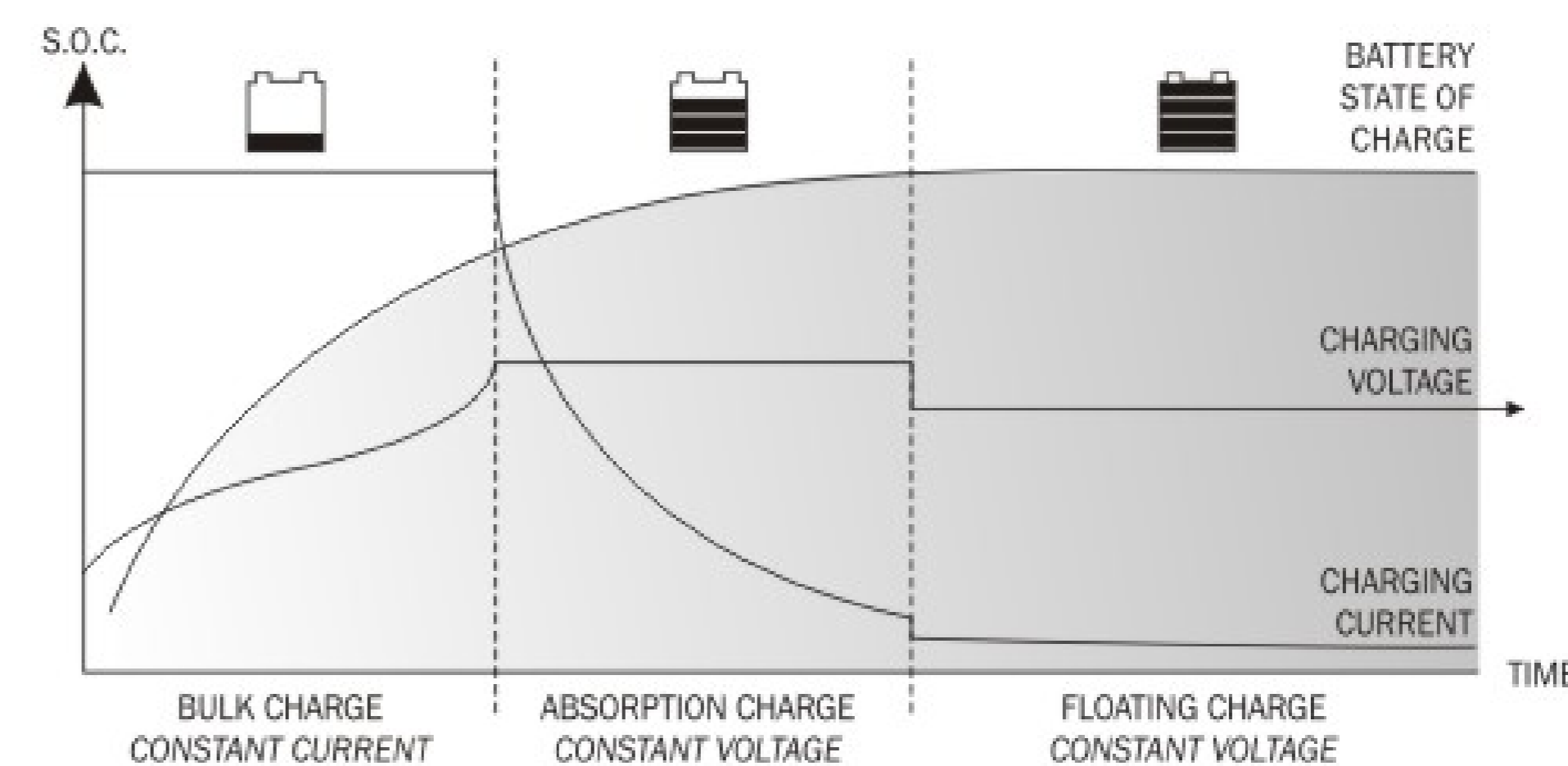
## 7. PROTECTION FUNCTION

It is designed with a universal protection circuit that provide added safety features not only for your AC appliances, batteries but also for itself.

Bypass and Inverter Mode Protection	Earth Fault Protection	The UPS shut down when the load has electric leakage.
	Low Voltage Alarm	Alarm activates when battery discharges to 10.6V.
	Over Voltage Protection	The UPS shuts down when battery discharges to 10V ( prevent damage to battery)
	Over Temperature Protection	The UPS will shut down when overheat.
	Overload Protection	The UPS shuts down when the loading power exceeds it's rating power
	Short Circuit Protection	The UPS shuts down when output short circuit happened
	Reverse Polarity Protection	By fuse open.

Soft Start Circuit	Gradual Voltage Ramp-up during inverter start-up	This eliminates failed cold start under load.
	Output that momentarily dips in voltage and quickly recovers.	This eliminates most shutdown from momentary overload.
	Automatically restart	The inverter part automatically re-start when overload remove.
Charger Mode Protection	Auto 3 stage battery charging	Stage 1. Constant Current- Rapid charge the battery with constant high current. Fit for heavy-loaded condition.
		Stage 2. Constant Voltage-Moderate charge the battery with constant voltage. this allow the battery to well absorb the charge and maximum battery's life.
		Stage 3. Floating Charge-After the battery is charged to around 99% full. The charger automatically switch to "floating-mode" that keeping the battery in good condition.

Auto.3 stage charge



## 8. INTERFERENCE WITH THE ELECTRONIC EQUIPMENT

Generally, most AC appliances operate with the UPS just as they work with house-hold AC power. Below is the information concerning two possible exceptions.

### 8.1. “Buzzing” sound in audio systems:

Some inexpensive stereo systems and “boom boxes” emit a buzzing sound from their speakers when operated from the power inverter. This occurs because the power supply in the electronic device does not adequately filter the modified sine wave produced by the inverter part. The only solution of this problem is use a higher quality sound system that incorporates a higher quality power amplified supply.

### 8.2. Television interference:

The UPS is shielded to minimize interference with TV signals. The problem may not be with the UPS. However, in some instances, some interference may still be visible, particularly with weak TV signals. Try to follow the corrective measures:

- Position the UPS as far as possible from the television, the antenna and the antenna cables. Use an extension cable, if necessary.
- Adjust the orientation of the UPS, the antenna cables and the TV power cord to minimize interference.
- Make sure that the antenna feeding the television provides an adequate (“snow free”) signal and that high quality, shielded antenna cables is used.
- Do not operate high-power appliances or tools when you are watching TV.

## 9. OPERATING TIPS

### 9.1. Rated Versus Actual Current Draw of Equipment

Most electrical tools, appliances and audio/video equipment have labels that indicate the power consumption in amps or watts. Be sure that the power consumption of the item you wish to operate is rated within UPS wattage or less. (if the power consumption is rated in amps AC, simply multiply by the AC volts to determine the wattage ). The UPS ( inverter mode ) will shut down if it is overload. The overload must be removed before the UPS restart. Resistive loads are the easiest for the UPS to run. However, larger resistive loads, such as electric stoves or heaters, usually require more wattage than the inverter can deliver. Inductive loads, such as TV's and stereos, require more current to operate than do resistive loads of the same wattage rating. Induction motors, as well as some televisions, may require 2 to 6 times their wattage rating to start up. The most demanding in the category are those that start under load, such as compressors and pumps. Testing is the only definitive way to determine whether a specific load it can run. To restart the unit after a shutdown due to overloading, remove the overload if necessary turn the power switch OFF then ON.

### 9.2. Power Tools and Microwave Ovens Won't Start

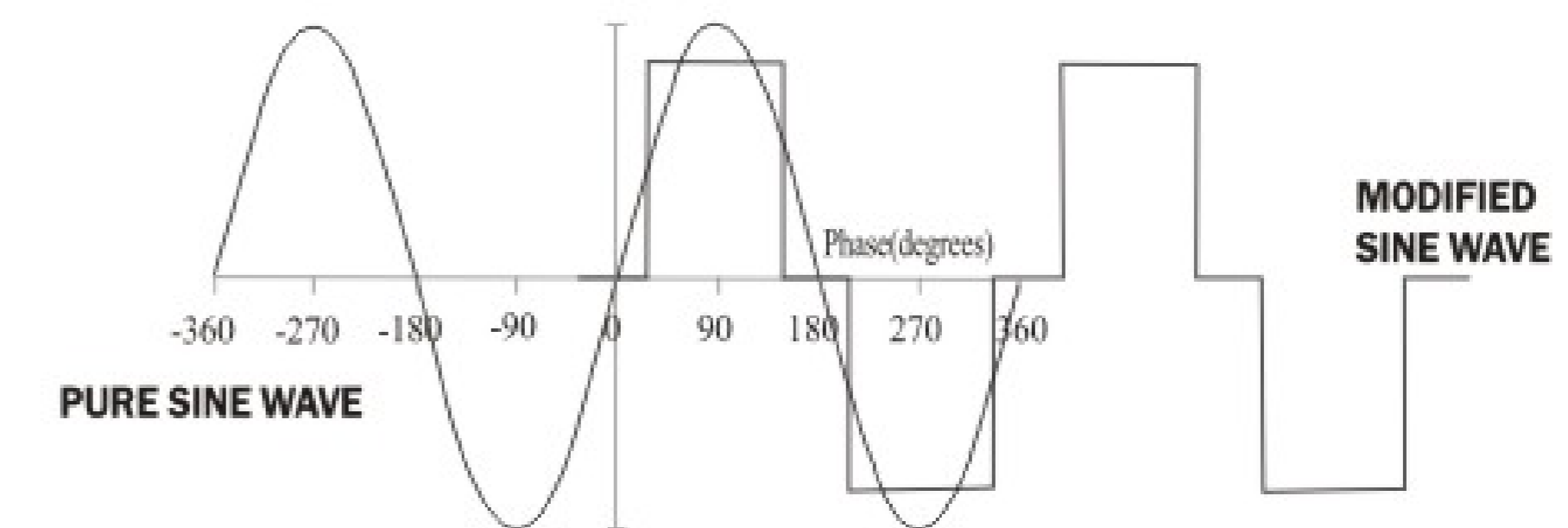
Read the information panel on each power tool carefully to accurately determine the tool's input wattage. The output wattage is sufficient to operate most power tools and microwave ovens but remember that the power needed to start the power tool may be as much as 2 to 6 times of its continuous wattage required.

### 9.3. The AC output waveform of the UPS (inverter mode) is know as the “modified sine wave”.

( see figure 1 ) It is a waveform that has characteristics similar to the sine wave shape of utility power. This type of waveform is suitable for most AC loads, including linear and switching power supplies used in electronic equipment, transformers, and motors. The modified sine wave produced by the inverter has an RMS (root mean square) voltage of

230volts, which is the same as standard household power. Most AC voltmeters (both digital and analog) are sensitive to the average value of the waveform rather than the RMS value. They are calibrated for RMS voltage under the assumption that the waveform measured will be a pure sine wave. These meters will not read the RMS voltage of a modified sine wave correctly. They will read about 20 to 30 volts low when measuring the output of the inverter. For accurate measurement of the output voltage of this unit, use a true RMS reading voltmeters such as a Fluke 87III, Fluke 8060 A, Fluke 77/99 series or Beckman 4410.

Figure 1: Modified Sine Wave and Pure Sine Wave Comparison



### 9.4. Battery's Back up time depends on the appliances which you will be used.

The batteries must provide between 10.5 and 15.5 volts DC (if 12V UPS) and must be able to supply the necessary current to operate the load. The power source should be a well condition deep-cycle Lead-acid battery. To obtain a rough estimate of the current (in amperes ) the power source must deliver, simply divide the power consumption of the load (in watts AC ) by 10. Example: if a load is rated at 100 watts AC, the power source must be able to deliver: 100/10=10A On larger applications the power source may be several batteries connected in parallel. It is important to make sure the cables have enough size. This manual does not describe all of the possible types of battery configurations, battery charging configurations and battery isolation configurations.

### 9.5. Battery Charger

We recommend you use deep cycle batteries. If you hear the alarm of low voltage protection, please stopping to use it, when it is fully charged, you can use it again. Please plug into the public power to charge for the battery.

The battery operation time depends on the battery capacity(Ah) and the loading power (Watt)

The method to calculate the operation time is:

Battery capacity (Ah) x input voltage(V)/ loading power(W)

Example:

Battery capacity=	150Ah
Input voltage=	12V
Loading power=	600W
(150Ah x 12V)/600W=	3H

## 10. TROUBLE SHOOTING

### 10.1. When public power failure and Inverter switch ON, the problem happened in the inverter mode.

TROUBLE		POSSIBLE CAUSE	SUGGESTED REMEDY
No AC output	Red LED lit, green LED not lit or beep sound alarm	Battery over discharge, low battery protection.	Change the battery or charging for it
		Over temperature protection	Remove or reduce load, wait for UPS cooling
		Overload protection	Remove or reduce load or use more big power UPS
		Short circuit protection	Reduce load or remove short circuit
No AC output	Red and green LED not lit	Fuse burned	Change fuse or contact technical support(refer to the part 11.4)
No AC output	Red and green LED not lit	Fuse burned	Change fuse or contact technical support(refer to the part 11.4)
		PCB broken	Contact Seller for repair or changed
		Battery's defective or poor connection	Change battery or re-connect the battery
	Red and green LED lit	Earth fault protection	Unplug the fault load
		Strong collision cause the circuit loosen	Contact seller for repairing or change
Battery run time is less than expected	AC loads power consumption is higher than the rated power	Use a larger battery or connect more batteries in parallel to increase the back up time	
	Battery is old or defective	Replace the battery	
	Battery over discharge	Charge for the battery	
	Power dissipation caused by the too long or thin cable	Use more shorter /heavier DC cables	

### 10.2. When public power on, the problem happened in bypass and charger mode.

TROUBLE		POSSIBLE CAUSE	SUGGESTED REMEDY
When the public power available, inverter mode can't be switch to charger mode	Poor AC wire connection	Tighten connection or re-connect the AC power	
	built in fuse burned	Change fuse or contact technical support(refer to the part 11.4)	
UPS beep long time but still on working	Battery will be fully charged soon	It will be auto stop the charge or you switch off charger mode	
	AC input voltage under 170V/70V	Stop to use it or switch off the charger mode or adjust AC voltage	
	Using time too long, high temperature	Switch off 10 minutes for cool	

### 10.3. Other problem

TROUBLE	POSSIBLE CAUSE	SUGGESTED REMEDY
Cooling fan not working	It will working when in charge mode, after fully charged it will auto stop	It is normal
Cooling fan not working	When AC main power failure, it should be working in inverter mode, but it is not work	Contact seller for repairing or replace it
Used with sensitive loads, there is light noise	SOU series unit output waveform. Light noise sounds it is normal	You can choose our SU series products with output waveform pure sine wave
Used with TV, radio snow free or buzzing sound	Refer to part 9 in this manual	
UPS output shows low voltage	Reading voltmeters can't get accurate data	Use a true RMS reading voltmeters

### 10.4. Replace the fuse



#### WARNING!

Please contact seller or technical support , do not assemble it by yourself !

Note: There is spare fuse in the package, if public power voltage is too high or loads power is more than the UPS rated power too much, the fuse will burnout , and if polarity reverse or used with very big power appliances , the fuse will burn out.

## 11. AVR PROTECTION FUNCTION

The newest version modified sine wave inverter with charger adds the AVR function to ensure best performance and protection for units and loads.

11.1 Wide input AC voltage range 170V~260V AC

11.2 Always stable output voltage, best protection for your appliances.

11.3 AC input low voltage, over voltage protection. When the input voltage less 170V AC or over 260V AC, it shall switch to inverter mode automatically.

11.4 Time delay function: When connection ready, switch on inverter and charger, the charger shall start to charge for the battery after 20~30 seconds. So if grid power failure and coming again, the charger shall delay 20~30s to charge the battery. The time delay function best protect the units, especially in some places where grid power failure frequently.

11.5 Two transfer time modes adjustable by dip switch.

## 12. CLEANING, CARE AND MAINTENANCE

Always disconnect the power inverter from the 12V power source and the external appliance from the socket before starting any cleaning or maintenance. Keep all air inlets and vents free of dirt and dust. Clean the power inverter with a moistened cloth. Do not use abrasive utensils for cleaning. Store the power inverter in a dry place, well ventilated and in a temperature range between 0°C and 40°C. Do not store in direct sunlight, near heater, radiators or under moist and wet environment conditions.

## 13. DISPOSAL



Old electrical appliances are recyclable. Do not dispose them in the domestic waste! Separately deliver these in a valuable material collection point. Dispose the packing material environmentally friendly. Please give cardboard and paper to the waste paper, foils to a valuable material collection point.

## 14. SPECIFICATION

	Model	SOU-600	SOU-800	SOU-1000	SOD-1200	SOD-1500	SOD-2000	SOD-2500	SOD-3000	SOD-3500	
	Output	Rated Power	600W	800W	1000W	1200W	1500W	2000W	2500W	3000W	3500W
Surge Power		1200W	1600W	2000W	2400W	3000W	4000W	5000W	6000W	7000W	
AC output		220 ± 10% 50Hz or 110V ± 10% 60Hz									
Wave form		Modified Sine Wave.									
Other		USB 5V 2.4A									
Input		DC Input	12V(10-15V) or 24V(21-30V)								
	AC Input	170-250V(220V) or 70-150V (110V)									
	AVR Protection function	Automatic Voltage Regulated									
Charger	Max. Current	12V	10A	10A	10A	10A	10A	15A	15A	15A	15A
		24V	5A	5A	5A	5A	5A	8A	8A	8A	8A
	Charge Way	Fast charge , Constant Voltage, Floating Charge(Auto.3 Stage)									
	Transfer time	<10ms(Switch less than 5 times within 1 minute)									
Protection Function	Overload	630-700W	820-880W	1100-1200W	1220-1300W	1600-1700W	2100-2200W	2600-2700W	3200-3300W	3600-3700W	
	Over Temperature	>60°C auto. shutdown									
	Other	Earth Leakage, Polarity Reverse, Over Voltage, Low Voltage, Overload, Overheat, Short Circuit protection									

Note: Specifications is subject to change without notices.

## 15. WARRANTY

### Our factory(dealer) warranty for the products

#### 15.1. Limited product warranty and exclusions:

We provides a limited warranty that covers defects of the products you ordered caused by material or manufacturing faults. The warranty period is for 18 months and begins on the date of purchase by the original end user.

This limited warranty is made only to the original purchase of the unit, and is not transferable to any subsequent owner.

We will, at its option, repair or replace the defective component(s) free of charge, provide that our factory is notified of the defect during the warranty period and a dated proof of purchase is furnished. We reserve the right to inspect the faulty component(s) and determine if the defect is due to material or manufacturing flaws. We also reserve the right to charge for service time expended if the defect is not due to material or manufacturing flaws or is not for some other reason subject to this limited warranty. We does not warrant unit from any and all defects or damages caused by :

- A. Normal wear and tear
- B. Shipping or transportation damages
- C. Improper use or installation
- D. Explosure to unsuitable environment conditions ( including but not limited to damage due to lightning strikes)
- E. unauthorized or abnormal use or operation
- F. Negligence or accidents
- G. material or workmanship not provied by us

H. This warranty does not cover costs related to removal, installation, or troubleshooting of your electrical systems. We will, at its option, use new and / or reconditioned parts in performing warranty repair and in building replacement products.

We reserve the right to use parts or products of original or improved design in the repair or replacement. If we repair or replace product, its warranty continues for the remaining portion of the original warranty period expires later. All replaced products and all parts removed from repaired products become the property of us. We cover both parts and labor necessary to repair the product and return shipment to the customer, via a our selected non-expedited freight carrier within installation, removal or re-installation of the unit.

#### 15.2. Buyer (customer) information:

Customer Name		Date of Purchase	
Product model		Contact Number	
Product No.		E-mail Address	

Signature: \_\_\_\_\_

Selling Company:	
Selling Address:	
Contact Person:	Contact Number:

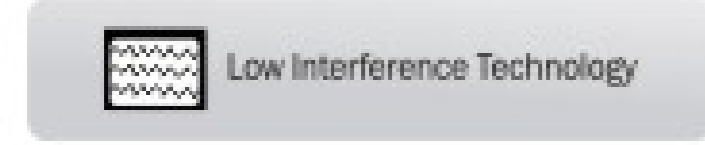


**Our factory authorized the dealer to sign or stamp, and this table come into effect should be signed or stamped by the dealer.**

**15.3. You will need to provide the following to help process your warranty and repair of the divide:**

- This table or manual.
- Copy of the till receipt( invoice, receipt) with the date of purchase.
- Reason for the complaint or a description of the fault.

**16. ICON INDICATION**



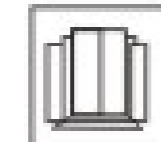
Conform to European standards



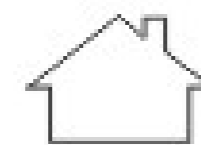
Layer Limited

**RoHS**

The Restriction of the use of certain hazardous substances in electrical and electronic equipment



Read the instruction before using your product.



For indoor use only



Handle with Care